Name:

at1118paper: Complete the Square (v412)

Example

By completing the square, find both solutions to the given equation:

$$x^2 - 52x = -480$$

Add $\left(\frac{-52}{2}\right)^2$, which equals 676, to both sides of the equation.

$$x^2 - 52x + 676 = 196$$

Factor the left side.

$$(x - 26)^2 = 196$$

Undo the squaring. We need to consider both $\pm\sqrt{196}$.

$$x - 26 = -14 \quad \text{or} \quad x - 26 = 14$$
$$x = 12 \quad \text{or} \quad x = 40$$

Question 1

By completing the square, find both solutions to the given equation:

$$x^2 - 32x = 105$$

$$x^2 - 32x + 256 = 361$$
$$(x - 16)^2 = 361$$
$$x - 16 = \pm 19$$
$$x = -3 \quad \text{or} \quad x = 35$$

Question 2

By completing the square, find both solutions to the given equation:

$$x^2 + 20x = 189$$

$$x^2 + 20x + 100 = 289$$
$$(x + 10)^2 = 289$$
$$x + 10 = \pm 17$$
$$x = -27 \quad \text{or} \quad x = 7$$

Question 3

By completing the square, find both solutions to the given equation:

$$x^2 + 6x = 216$$

$$x^2 + 6x + 9 = 225$$
$$(x+3)^2 = 225$$
$$x + 3 = \pm 15$$
$$x = -18 \quad \text{or} \quad x = 12$$

Question 4

By completing the square, find both solutions to the given equation:

$$x^2 + 26x = -153$$

$$x^2 + 26x + 169 = 16$$
$$(x+13)^2 = 16$$
$$x + 13 = \pm 4$$
$$x = -17 \quad \text{or} \quad x = -9$$

Question 5

By completing the square, find both solutions to the given equation:

$$x^2 - 56x = -780$$

$$x^2 - 56x + 784 = 4$$
$$(x-28)^2 = 4$$
$$x - 28 = \pm 2$$
$$x = 26 \quad \text{or} \quad x = 30$$

Question 6

By completing the square, find both solutions to the given equation:

$$x^2 - 36x = -323$$

$$x^2 - 36x + 324 = 1$$
$$(x-18)^2 = 1$$
$$x - 18 = \pm 1$$
$$x = 17 \quad \text{or} \quad x = 19$$